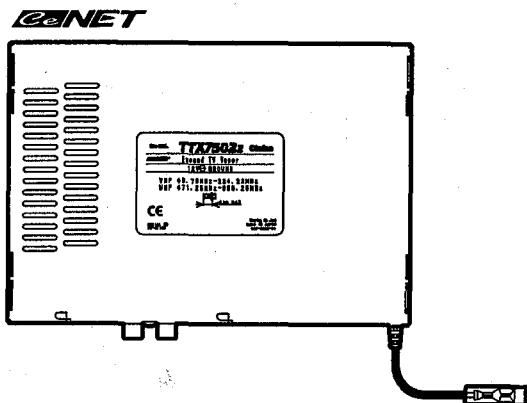




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Service Manual



Expanded TV Tuner

Model TTX7502z
(ZT-4610E)

■ PRECAUTIONS

1. This unit does not operate independently. The unit must be used with a center unit that has a cable connection for CeNET wire bound.
2. The CeNET cable wiring must be less than 20m(65.62ft) in length.

■ SPECIFICATIONS

Reception channels: VHF 45.75 - 224.24MHz
(1 - 12 channels)
UHF 471.25 - 855.25 MHz
(13 - 62 channels)

Antenna input: 75Ω unbalanced

Power supply voltage: 14.4V

Ground: Negative ground

Power consumption: 0.4 A or less

External dimensions(mm): 178(W)×25(H)×125(D)

Weight: 0.5kg

* Specifications and design are subject to change without notice for further improvement.

■ COMPONENTS

ZT-4610E-A

TV tuner unit	-----	1
Ce-NET cable	855-3421-00	1
Picture RCA cable	855-5422-00	1
Parts bag	921-9472-00	1
Velcro tape(80X39 Hook)	348-0133-00	2
Velcro tape(80X39 Loop)	348-0134-00	2
Insulock tie	335-3847-00	2
Urethane seat	345-7010-00	5
PKG connection cable	850-6719-02	1

■ NOTE

We cannot supply PWB with component parts in principle. When a circuit on PWB has failure, please repair it by component parts base. Parts which are not mentioned in service manual are not supplied.

■ To engineers in charge of repair or inspection of our products.

Before repair or inspection, make sure to follow the instructions so that customers and Engineers in charge of repair or inspection can avoid suffering any risk or injury.

1. Use specified parts.
The system uses parts with special safety features against fire and voltage. Use only parts with equivalent characteristics when replacing them.
The use of unspecified parts shall be regarded as remodeling for which we shall not be liable. The onus of product liability (PL) shall not be our responsibility in cases where an accident or failure is as a result of unspecified parts being used.
2. Place the parts and wiring back in their original positions after replacement or re-wiring.
For proper circuit construction, use of insulation tubes, bonding, gaps to PWB, etc, is involved. The wiring connection and routing to the PWB are specially planned using clamps to keep away from heated and high voltage parts. Ensure that they are placed back in their original positions after repair or inspection.
If extended damage is caused due to negligence during repair, the legal responsibility shall be with the repairing company.

3. Check for safety after repair.

Check that the screws, parts and wires are put back securely in their original position after repair. Ensure for safety reasons there is no possibility of secondary problems around the repaired spots.

If extended damage is caused due to negligence of repair, the legal responsibility shall be with the repairing company.

4. Caution in removal and making wiring connection to the parts for the automobile.

Disconnect the battery terminal after turning the ignition key off. If wrong wiring connections are made with the battery connected, a short circuit and/or fire may occur. If extensive damage is caused due to negligence of repair, the legal responsibility shall be with the repairing company.

5. Cautions regarding chips.

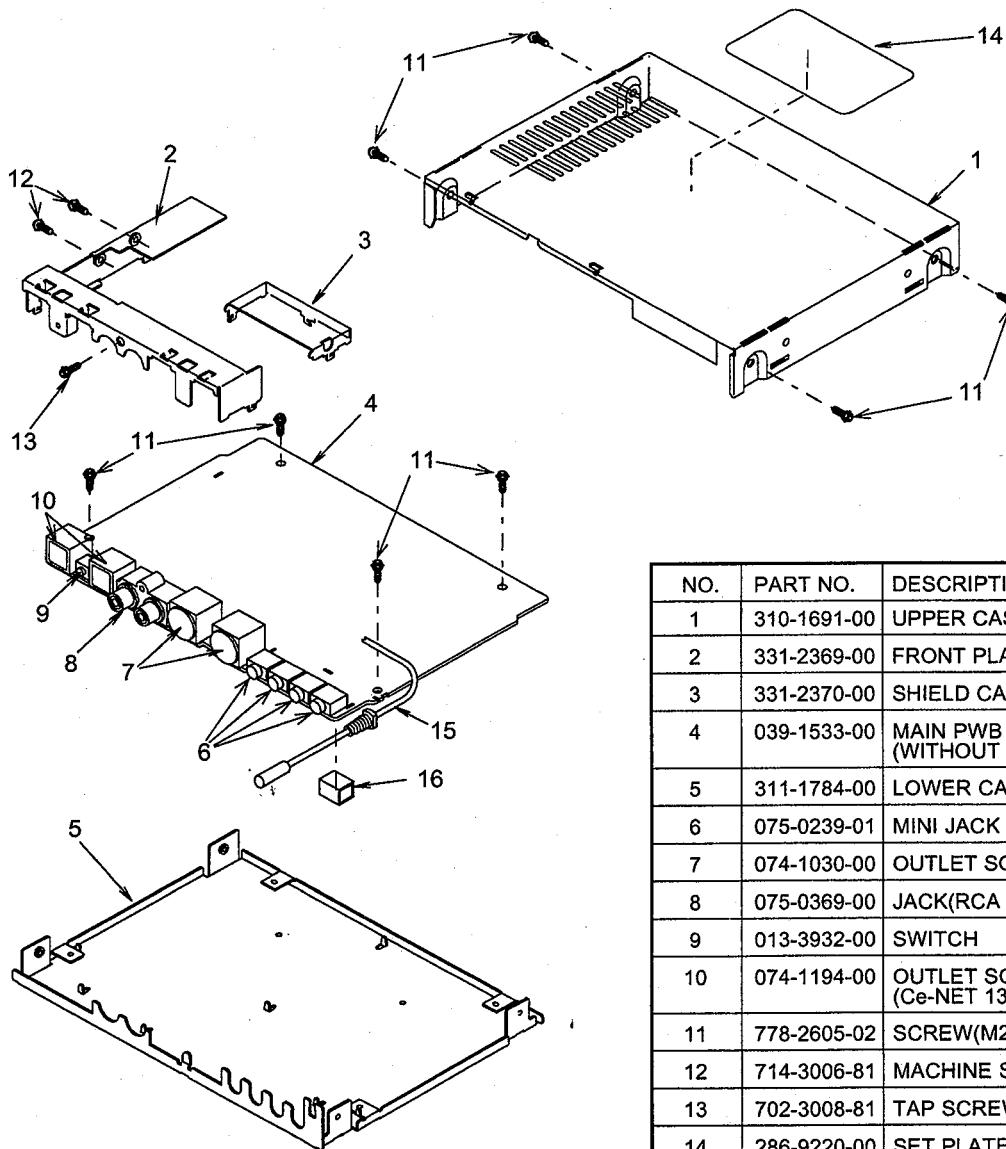
Do not reuse removed chips even when no abnormality is observed in their appearance. Always replace them with new ones. (The chip parts include resistors, capacitors, diodes, transistors, etc). The negative pole of tantalum capacitors is highly susceptible to heat, so use special care when replacing them and check the operation afterwards.

6. Cautions in handling flexible PWB

Before working with a soldering iron, make sure that the iron tip temperature is around 270°C. Take care not to apply the iron tip repeatedly (more than three times) to the same patterns. Also take care not to apply the tip with force.

7. Turn the unit OFF during disassembly and parts replacement. Recheck all work before you apply power to the unit.

■ EXPLODED VIEW • PARTS LIST



NO.	PART NO.	DESCRIPTION	Q'TY
1	310-1691-00	UPPER CASE	1
2	331-2369-00	FRONT PLATE	1
3	331-2370-00	SHIELD CASE	1
4	039-1533-00	MAIN PWB (WITHOUT COMPONENT)	1
5	311-1784-00	LOWER CASE	1
6	075-0239-01	MINI JACK	4
7	074-1030-00	OUTLET SOCKET(MINI 8P)	2
8	075-0369-00	JACK(RCA 2P)	1
9	013-3932-00	SWITCH	1
10	074-1194-00	OUTLET SOCKET (Ce-NET 13P)	2
11	778-2605-02	SCREW(M2.6×5)	4
12	714-3006-81	MACHINE SCREW(M3×6)	2
13	702-3008-81	TAP SCREW(Φ3×8)	1
14	286-9220-00	SET PLATE	1
15	854-6354-00	EXTENSION LEAD(PKB.)	1
16	345-8390-00	GASKET	1

■ EXPLANATION OF IC

■ μ PD78098BGC-503-8BT 052-6033-10 Ce-NET B/B Tuner Controller

1. Outward Form : 80 pins QFP

3. Terminal Description

pin 1 : TV 5V : O : 5V voltage supply control.
 pin 2 : TV 9V : O : 9V voltage supply control.
 pin 3 : NU : IN : Not in use.
 pin 4 : A VSS : - : Ground.
 pin 5 : AUX SEL 2 : IN : Aux select input. Ref. table 1.
 pin 6 : AUX SEL 3 : IN : Aux select input. Ref. table 1.
 pin 7 : A Vref 1 : IN : Connect to VDD.
 pin 8 : A SEL 1 : O : Audio select output. Ref. Table 2.
 pin 9 : A SEL 2 : O : Audio select output. Ref. Table 2.
 pin 10 : NU : IN : Not in use.
 pin 11 : V SEL 1 : O : Rear-out select output. Ref. Table 3.
 pin 12 : V SEL 2 : O : Rear-out select output. Ref. Table 3.
 pin 13 : V SEL 3 : O : Front-out select output. Ref. Table 4.
 pin 14 : V SEL 4 : O : Front-out select output. Ref. Table 4.
 pin 15 : ANT 1 : O : TV antenna select output. Ref. Table 5.
 pin 16 : ANT 2 : O : TV antenna select output. Ref. Table 5.
 pin 17 : DIV SEL : O : Diversity priority select.
 " L = Image, " H = Audio.
 pin 18 : DIV ON : O : " L = Diversity ON, " H = Diversity OFF.
 pin 19 : SIMUKE : IN : " L = Europe, " H = Third area.
 pin 20 : NU : IN : Not in use.
 pin 21 : NU : IN : Not in use.
 pin 22 : NU : IN : Not in use.
 pin 23 : NU : IN : Not in use.
 pin 24 : NU : IN : Not in use.
 pin 25 : NU : IN : Not in use.
 pin 26 : NU : IN : Not in use.
 pin 27 : NU : IN : Not in use.
 pin 28 : NU : IN : Not in use.
 pin 29 : NU : IN : Not in use.
 pin 30 : NU : IN : Not in use.
 pin 31 : NU : IN : Not in use.
 pin 32 : NU : IN : Not in use.
 pin 33 : VSS : - : Ground.
 pin 34 : NU : IN : Not in use.
 pin 35 : NU : IN : Not in use.
 pin 36 : NU : IN : Not in use.
 pin 37 : NU : IN : Not in use.
 pin 38 : S 1 : O : Audio carrier select. Ref. table 6.
 pin 39 : S 2 : O : Audio carrier select. Ref. table 6.
 pin 40 : S 3 : O : Audio carrier select. Ref. table 6.
 pin 41 : PLL CLK : O : PLL clock output.
 pin 42 : PLL DO : O : PLL data output.
 pin 43 : PLL CE : O : PLL chip enable output.
 pin 44 : PLL LOCK : IN : PLL lock detect signal input.
 pin 45 : NU : IN : Not in use.
 pin 46 : NU : IN : Not in use.
 pin 47 : CSY : IN : Composite signal input.
 pin 48 : NU : O : Not in use.
 pin 49 : NU : O : Not in use.
 pin 50 : MUTE_ : O : Tuner mute signal output.
 pin 51 : BUS A OUT : O : Bus audio select output.
 pin 52 : NU : IN : Not in use.
 pin 53 : NU : IN : Not in use.
 pin 54 : NU : IN : Not in use.
 pin 55 : NU : IN : Not in use.
 pin 56 : IE BUS OUT : O : IE bus output.
 pin 57 : IE BUS IN : IN : IE bus input.
 pin 58 : NU : IN : Not in use.
 pin 59 : NU : IN : Not in use.
 pin 60 : RESET : IN : Reset input.
 pin 61 : NU : IN : Not in use.
 pin 62 : BU DET : IN : Backup detect.
 pin 63 : NU : IN : Not in use.
 pin 64 : PKB : IN : Parking brake input.
 pin 65 : SYS ACC : IN : System ACC detect.
 pin 66 : NU : IN : Not in use.
 pin 67 : NU : IN : Not in use.
 pin 68 : VDD : - : Positive supply voltage.
 pin 69 : X 2 : - : 6.29MHz crystal connection.
 pin 70 : X 1 : IN : 6.29MHz crystal connection.
 pin 71 : IC : - : Connect to ground.

pin 72 : XT 2 : IN : Open.
 pin 73 : XT 1 : IN : Connect to ground.
 pin 74 : A VDD : - : Connect to VDD.
 pin 75 : NU : IN : Not in use.
 pin 76 : NU : IN : Not in use.
 pin 77 : NU : IN : Not in use.
 pin 78 : NU : IN : Not in use.
 pin 79 : NU : IN : Not in use.
 pin 80 : NU : IN : Not in use.

Table 1. Aux select input

	Aux Sel 3(pin6)	Aux Sel 2(pin5)
Audio signal interrupt	L	L
Image signal interrupt	L	H
No connection	H	L
No connection	H	H

Table 2. Audio select output

	A Sel 1 (pin8)	A Sel 2 (pin9)
-----	L	L
-----	L	H
VTR	H	L
TV	H	H

Table 3. Rear-out select output

	V Sel 2 (pin12)	V Sel 1 (pin11)
TV	L	L
VTR	L	H
Black	H	L
Black	H	H

Table 4. Front-out select output

	V Sel 4 (pin14)	V Sel 3 (pin13)
Black	L	L
TV/VTR	L	H
8p	H	L
8p	H	H

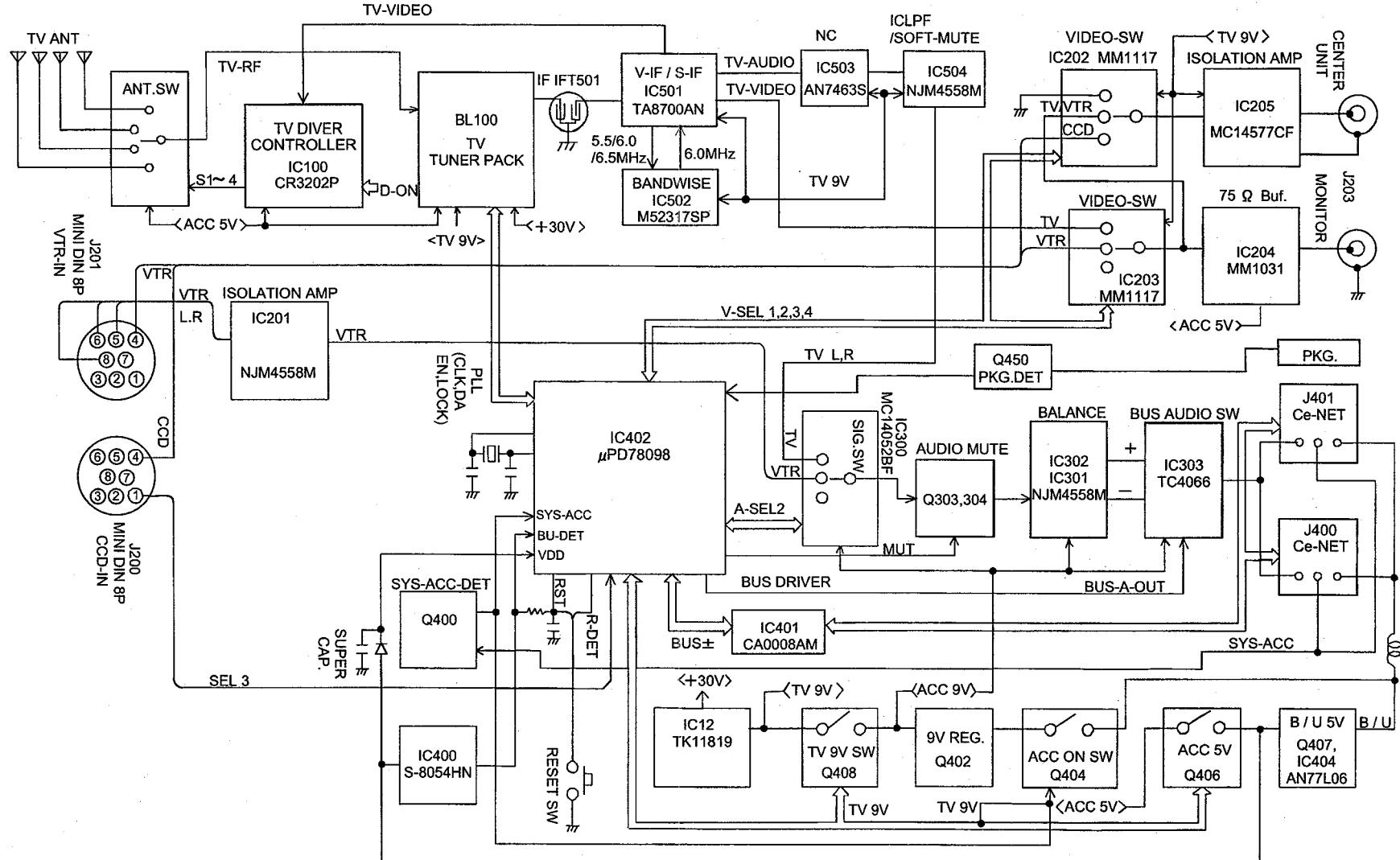
Table 5. TV antenna select output

	Ant 2 (pin16)	Ant 1 (pin15)
Antenna 4	L	L
Antenna 3	L	H
Antenna 2	H	L
Antenna 1	H	H

Table 6. Audio carrier select

	S1(pin38)	S2(pin39)	S3(pin40)
5.5MHz	L	H	L
6.0MHz	H	L	L
6.5MHz	H	H	L

■ BLOCK DIAGRAM



■ ELECTRICAL PARTS LIST

Main PWB (B1)

Note) Several different parts of the same reference number are alternative parts.
One of those parts is used in the set.

REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION
BL100	941-0203-10	TV TUNER	C310	163-4753-50	35V4.7 μ F	C537	178-4732-78	0.047 μ F
C6	178-2235-06	0.022 μ F	C311	163-4753-50	35V4.7 μ F	C538	163-4753-50	35V4.7 μ F
C7	163-4753-61	50V0.47 μ F	C312	163-1073-31	16V100 μ F	C539	178-1042-78	0.1 μ F
C10	042-0527-80	16V47 μ F(OS)	C313	163-1073-31	16V100 μ F	C540	178-2722-78	2700pF
C42	163-4753-61	50V0.47 μ F	C314	163-4753-50	35V4.7 μ F	C541	178-1032-78	0.01 μ F
C49	163-4763-30	16V47 μ F	C315	163-4753-50	35V4.7 μ F	C542	178-1042-78	0.1 μ F
C51	178-1032-78	0.01 μ F	C316	163-4753-50	35V4.7 μ F	C543	178-2242-78	0.22 μ F
C53	178-1042-78	0.1 μ F	C317	163-4753-50	35V4.7 μ F	C544	178-2712-78	270pF
C100	176-4701-00	47pF CH	C318	163-4753-50	35V4.7 μ F	C545	163-4763-30	16V47 μ F
C101	176-4701-00	47pF CH	C319	178-1032-78	0.01 μ F	C546	178-1022-78	1000pF
C102	176-4701-00	47pF CH	C320	163-1073-31	16V100 μ F	C547	176-1011-00	100pF CH
C103	176-4701-00	47pF CH	C321	163-1063-30	16V10 μ F	C548	178-1022-78	1000pF
C104	176-1011-00	100pF CH	C322	163-1063-30	16V10 μ F	C549	163-4763-30	16V47 μ F
C106	178-1022-78	1000pF	C323	163-1063-30	16V10 μ F	C550	178-2732-78	0.027 μ F
C109	178-1022-78	1000pF	C324	163-1063-30	16V10 μ F	C551	178-2232-78	0.022 μ F
C110	176-4711-00	470pF CH	C400	178-1032-78	0.01 μ F	C552	178-2732-78	0.027 μ F
C111	178-1022-78	1000pF	C401	178-2242-78	0.22 μ F	C553	178-1232-78	0.012 μ F
C112	178-1022-78	1000pF	C404	178-2242-78	0.22 μ F	C554	163-1063-30	16V10 μ F
C113	163-4763-10	6.3V47 μ F	C405	163-1063-30	16V10 μ F	C555	178-5622-78	5600pF
C114	042-0416-02	6.3V10 μ F	C406	178-1032-78	0.01 μ F	C556	163-1063-30	16V10 μ F
C115	178-2232-78	0.022 μ F	C407	163-4763-10	6.3V47 μ F	C557	163-2263-30	16V22 μ F
C116	176-8211-00	820pF CH	C408	178-2232-78	0.022 μ F	D1	001-0627-00	U1BC44
C118	178-1022-78	1000pF	C409	042-0576-00	5.5V0.1 μ F	D100	001-0579-00	1SV128
C120	178-1022-78	1000pF	C410	178-1042-78	0.1 μ F	D101	001-0579-00	1SV128
C121	042-0397-06	35V0.1 μ F	C417	163-1073-31	16V100 μ F	D102	001-0579-00	1SV128
C122	178-3342-78	0.33 μ F	C418	163-1073-31	16V100 μ F	D103	001-0579-00	1SV128
C123	178-5622-78	5600pF	C419	172-1041-11	0.1 μ F	D104	001-4901-96	MA3082WA-TA
C124	178-5622-78	5600pF	C420	172-1041-11	0.1 μ F	D106	001-4901-96	MA3082WA-TA
C125	178-2232-78	0.022 μ F	C421	184-1083-32	16V1000 μ F	D200	001-4901-96	MA3082WA-TA
C126	176-6811-50	680pF CH	C422	176-2201-00	22pF CH	D201	001-0367-00	1SS226
C127	178-1032-78	0.01 μ F	C423	176-2201-00	22pF CH	D202	001-0367-00	1SS226
C128	163-1063-30	16V10 μ F	C425	178-1042-78	0.1 μ F	D400	001-0516-00	MA111
C129	163-1053-60	50V1 μ F	C426	178-2242-78	0.22 μ F	D403	001-0516-00	MA111
C130	178-2722-78	2700pF	C450	178-1042-78	0.1 μ F	D404	001-0516-00	MA111
C131	163-4763-10	6.3V47 μ F	C501	176-1011-00	100pF CH	D405	001-0516-00	MA111
C132	178-1032-78	0.01 μ F	C502	176-1007-00	10pF CH	D406	001-0516-00	MA111
C133	178-1035-06	0.01 μ F	C503	163-1073-31	16V100 μ F	D409	001-0377-47	MA4091M
C134	163-4763-30	16V47 μ F	C504	163-4753-50	35V4.7 μ F	D450	001-0516-00	MA111
C135	178-1032-78	0.01 μ F	C505	178-1032-78	0.01 μ F	D501	001-0541-00	MA157
C136	178-2222-78	2200pF	C506	042-0416-02	10V10 μ F	IC12	051-3245-00	TK11819
C144	178-1042-78	0.1 μ F	C507	178-1032-78	0.01 μ F	IC100	051-4404-00	CR3202P
C203	163-1063-30	16V10 μ F	C508	178-1032-78	0.01 μ F	IC201	051-0350-55	NJM4558M
C204	163-1063-30	16V10 μ F	C509	163-1063-30	16V10 μ F	IC202	051-5306-90	MM1117XF
C205	163-1063-30	16V10 μ F	C510	178-1032-78	0.01 μ F	IC203	051-5306-90	MM1117XF
C207	176-2211-00	220pF CH	C511	042-0416-02	10V10 μ F	IC204	051-1621-00	MM1031XM
C209	176-2211-00	220pF CH	C512	178-1032-78	0.01 μ F	IC205	051-5311-90	MC14577C-F
C210	178-1055-79	1 μ F	C513	163-4743-60	50V0.47 μ F	IC300	051-0410-35	MC14052BF
C211	178-1055-79	1 μ F	C514	178-1032-78	0.01 μ F	IC301	051-0350-55	NJM4558M
C212	178-1055-79	1 μ F	C515	178-2232-78	0.022 μ F	IC302	051-0350-55	NJM4558M
C213	178-2232-78	0.022 μ F	C516	176-3301-00	33pF CH	IC303	051-7102-18	TC4066BFT(N)
C214	163-1053-60	50V1 μ F	C517	163-4753-50	35V4.7 μ F	IC400	051-0940-00	S-8054 HN
C215	178-2232-78	0.022 μ F	C518	176-3301-00	33pF CH	IC401	051-6600-38	CA0008AM
C216	163-1063-30	16V10 μ F	C519	178-1032-78	0.01 μ F	IC402	052-6033-10	uPD78098BGC-503-8BT
C217	176-3096-00	3pF CJ	C520	178-1022-78	1000pF	IC404	051-3201-00	AN77L06
C218	163-1063-30	16V10 μ F	C521	163-1063-30	16V10 μ F	IC501	051-1755-10	TA8700AN
C219	178-1042-78	0.1 μ F	C522	163-1063-30	16V10 μ F	IC502	051-5310-00	M52317SP
C220	184-4773-22	10V470 μ F	C523	178-1032-78	0.01 μ F	IC503	051-0987-01	AN7463S
C221	163-1073-31	16V100 μ F	C524	178-1032-78	0.01 μ F	IC504	051-0350-55	NJM4558M
C222	178-1042-78	0.1 μ F	C525	178-2222-78	2200pF	IFT501	060-2200-01	SAF38.9MX70Z
C223	184-4773-22	10V470 μ F	C526	178-1022-78	1000pF	IFT502	060-2000-02	CDSH6.0MC38K
C224	178-1055-79	1 μ F	C527	176-1011-00	100pF CH	IFT503	060-2606-00	TPS5.5MB
C225	178-1042-78	0.1 μ F	C528	176-3301-00	33pF CH	IFT504	060-2606-02	TPS6.0MB
C226	178-1042-78	0.1 μ F	C529	163-1063-30	16V10 μ F	IFT505	060-2606-01	TPS6.5MB
C300	163-4753-50	35V4.7 μ F	C530	178-2232-78	0.022 μ F	IFT506	005-2003-02	SFSL6.0MCB
C302	163-4753-50	35V4.7 μ F	C531	176-1801-00	18pF CH	IFT507	005-5005-00	IFT 38.9MHz
C303	178-1022-78	1000pF	C532	176-1011-00	100pF CH	IFT508	005-2003-01	SFSL6.5MCB
C306	178-3342-78	0.33 μ F	C533	178-1032-78	0.01 μ F	J100	075-0239-01	ANT JACK
C307	163-4753-50	35V4.7 μ F	C534	178-2222-78	2200pF	J101	075-0239-01	ANT JACK
C308	163-4753-50	35V4.7 μ F	C535	163-1073-31	16V100 μ F			
C309	163-4753-50	35V4.7 μ F	C536	178-4732-78	0.047 μ F			

■ADJUSTMENT

1. Adjustment of LLD coil and measurement of image frequency specification.

Wiring connection

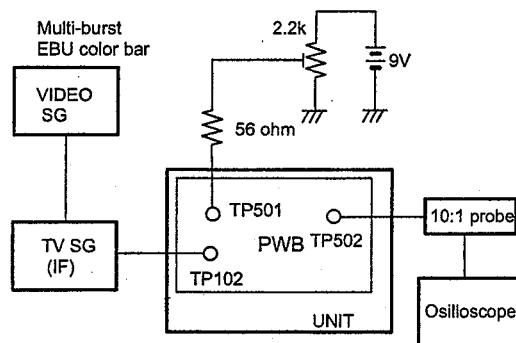


Fig.1

1. Remove the solder bridge of TP101 and TP102. And input the following signal to TP102.
Frequency: P=38.9MHz S=33.4MHz (invert mode)
Output level: 85dB μ
Image signal: multi-burst signal or EBU color bar signal
Voice modulation: 1kHz 30% (± 15 kHz) Dev. MONO
2. With the multi-burst signal, measure the waveform of TP502 by oscilloscope. (Fig.2)

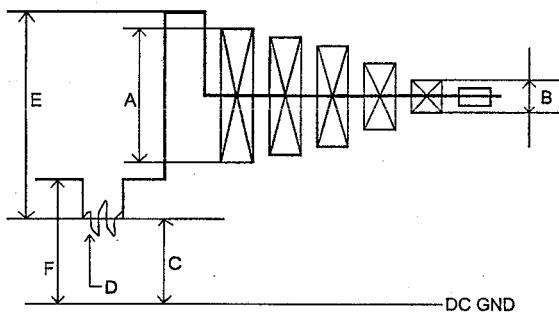


Fig.2

3. Adjust the IF-AGC voltage from TP501 with DC variable power supply so that the E-voltage in Fig.8 becomes approximately 1.5V.
4. Adjust the IFT507 so that the DC voltage of C or F Fig.8 becomes the minimum. When C-voltage drops and the wave form becomes unstable, adjust the IFT507 again.
5. Confirm that the H-SYNC (D) has no noise.
6. Confirm that the ratio of 4.43MHz (B) and 500kHz (A) is within the following range.
0.5/4.43MHz \cdots -10 \pm 4dB
(Acceptable if A:B=5:1 more)

2. RF-AGC adjustment

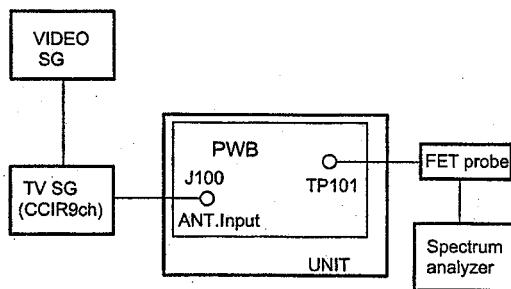


Fig.3

1. Solder-bridge the TP101 and TP102. And input the following signal of an antenna input.

C.C.I.R 9ch output level: 85dB μ

Visual signal: multi-burst signal

Voice modulation: 1kHz 30% (± 15 kHz) Dev. MONO

2. Adjust the VR501 so that the display level of the spectrum analyzer becomes 97dB μ to test patan TP101. (Fig.4)

The set value of the spectrum analyzer is as follows.
(Use the FET probe for measuring.)

RES \cdot BW = 300kHz

V \cdot BW = 300kHz

fo = 38.9MHz

f.span = 10MHz

3. Soft mute adjustment.

Wiring connection

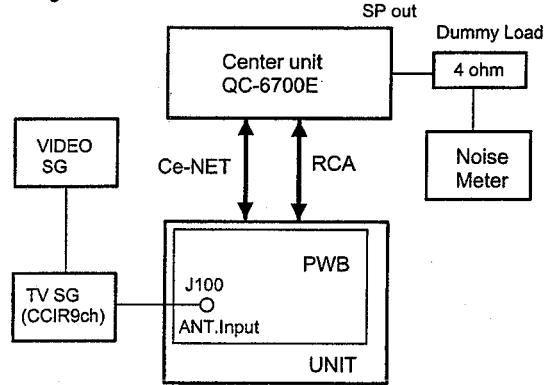


Fig.4

1. Input the following signal.

C.C.I.R 9ch output level: 65dB μ

Image signal: EBU color bar signal

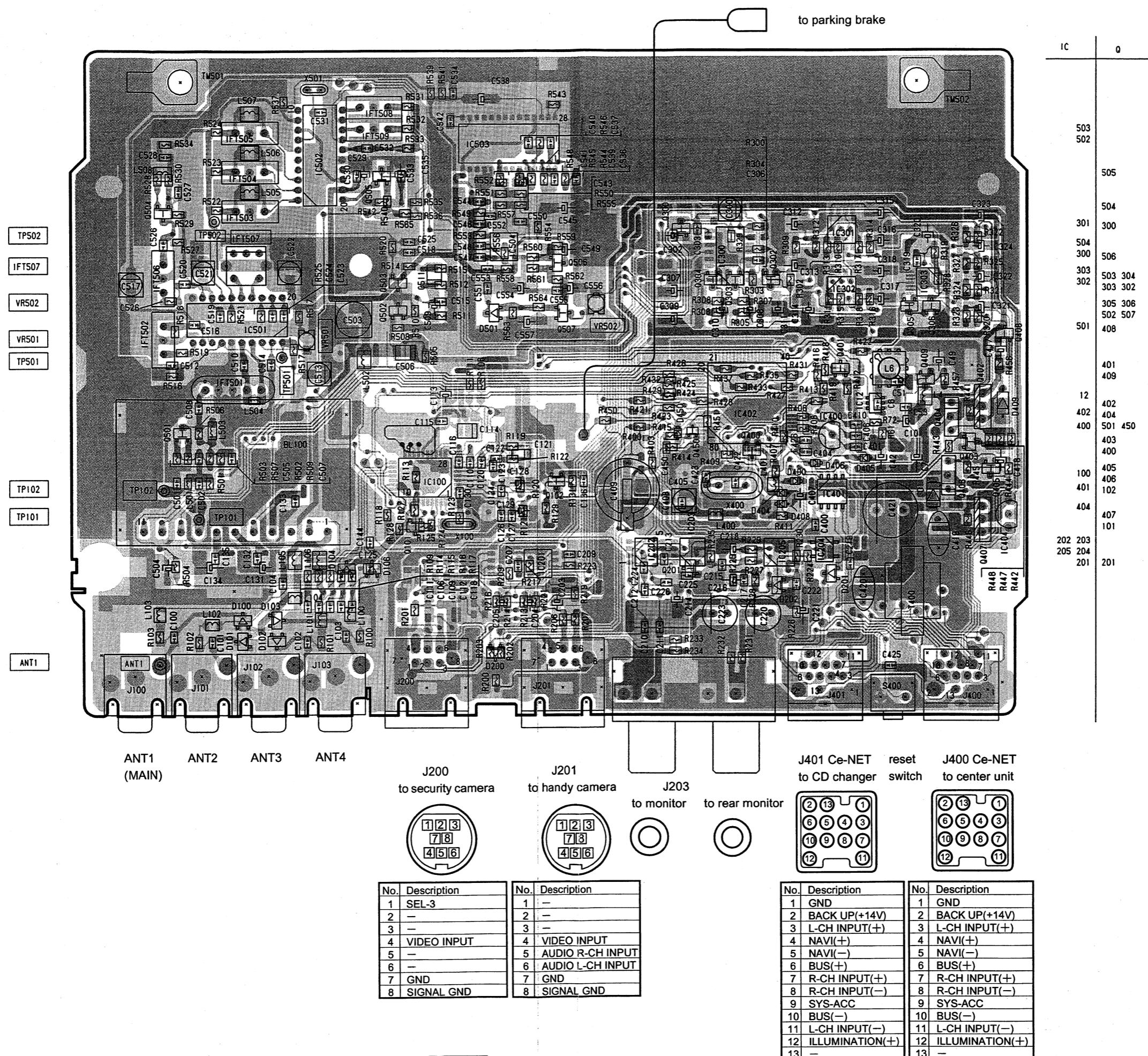
Voice modulation: 1kHz 30% (± 15 kHz) Dev. MONO

2. The point on which SP output of center does not clip is defined 0dB.
3. Adjust the VR502 so that the voice output level drops by 10dB \pm 1dB when the RF input is set to 0dB.

REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION	REF No.	PART No.	DESCRIPTION
J102	075-0239-01	ANT JACK	R125	117-1031-10	1/10W 10kΩ	R419	117-4721-10	1/10W 4.7kΩ
J103	075-0239-01	ANT JACK	R127	117-1031-10	1/10W 10kΩ	R421	117-1021-10	1/10W 1kΩ
J200	074-1030-00	MINI 8P	R128	117-1031-10	1/10W 10kΩ	R422	117-1021-10	1/10W 1kΩ
J201	074-1030-00	MINI 8P	R129	117-1021-10	1/10W 1kΩ	R423	117-1021-10	1/10W 1kΩ
J203	075-0369-00	2P RCA	R131	117-1021-10	1/10W 1kΩ	R424	117-1021-10	1/10W 1kΩ
J400	074-1194-00	13P CE-NET	R200	117-1011-10	1/10W 100Ω	R425	117-1021-10	1/10W 1kΩ
J401	074-1194-00	13P CE-NET	R201	117-1011-10	1/10W 100Ω	R426	117-1021-10	1/10W 1kΩ
L4	010-2199-86	100 μH J	R202	117-7501-10	1/10W 75Ω	R427	117-1021-10	1/10W 1kΩ
L6	010-3038-90	1.2mH	R203	117-7501-10	1/10W 75Ω	R428	117-1021-10	1/10W 1kΩ
L100	010-2323-63	4.7 μH	R206	117-2231-10	1/10W 22kΩ	R429	117-1021-10	1/10W 1kΩ
L101	010-2323-63	4.7 μH	R207	117-2231-10	1/10W 22kΩ	R431	117-1021-10	1/10W 1kΩ
L102	010-2323-63	4.7 μH	R209	117-4731-10	1/10W 47kΩ	R432	117-1021-10	1/10W 1kΩ
L103	010-2323-63	4.7 μH	R213	117-4731-10	1/10W 47kΩ	R433	117-1021-10	1/10W 1kΩ
L104	010-2323-64	1.5 μH	R214	117-4731-10	1/10W 47kΩ	R435	117-1021-10	1/10W 1kΩ
L105	010-2199-78	22 μH J	R216	117-1831-10	1/10W 18kΩ	R437	117-1021-10	1/10W 1kΩ
L106	010-2199-78	22 μH J	R217	117-1831-10	1/10W 18kΩ	R441	117-5611-10	1/10W 560Ω
L400	010-2323-02	1 μH	R219	117-4731-10	1/10W 47kΩ	R442	117-3321-10	1/10W 3.3kΩ
L401	010-2323-02	1 μH	R221	117-1831-10	1/10W 18kΩ	R443	117-1031-10	1/10W 10kΩ
L501	010-3001-01	0.22 μH	R223	117-1831-10	1/10W 18kΩ	R444	117-1221-10	1/10W 1.2kΩ
L502	010-2199-74	10 μH J	R224	117-1041-10	1/10W 100kΩ	R445	117-1031-10	1/10W 10kΩ
L503	010-2155-90	1.5 μH	R225	117-1021-10	1/10W 1kΩ	R446	117-2201-10	1/10W 22Ω
L504	010-2198-52	3.3 μH	R226	117-1011-10	1/10W 100Ω	R447	117-3321-10	1/10W 3.3kΩ
L505	010-2199-26	15 μH J	R227	117-1021-10	1/10W 1kΩ	R448	117-3321-10	1/10W 3.3kΩ
L506	010-2199-26	15 μH J	R228	117-2221-10	1/10W 2.2kΩ	R450	117-1031-10	1/10W 10kΩ
L507	010-2199-26	15 μH J	R229	117-2221-10	1/10W 2.2kΩ	R451	117-2231-10	1/10W 22kΩ
L508	010-2199-79	27 μH J	R230	117-3901-10	1/10W 39Ω	R456	117-1031-10	1/10W 10kΩ
Q101	125-2004-03	RN1403	R231	117-7501-10	1/10W 75Ω	R457	117-1221-10	1/10W 1.2kΩ
Q102	102-2712-00	2SC2712	R232	117-4731-10	1/10W 47kΩ	R501	117-1021-10	1/10W 1kΩ
Q201	100-1162-00	2SA1162	R233	117-4731-10	1/10W 47kΩ	R502	117-7521-10	1/10W 7.5kΩ
Q300	125-2004-03	RN1403	R234	117-7501-10	1/10W 75Ω	R503	117-1521-10	1/10W 1.5kΩ
Q302	100-1162-00	2SA1162	R235	117-1021-10	1/10W 1kΩ	R504	117-3921-10	1/10W 3.9kΩ
Q303	103-1306-00	2SD1306	R300	117-4731-10	1/10W 47kΩ	R505	117-1021-10	1/10W 1kΩ
Q304	103-1306-00	2SD1306	R302	117-1031-10	1/10W 10kΩ	R506	117-3311-10	1/10W 330Ω
Q305	125-2004-03	RN1403	R303	117-1021-10	1/10W 1kΩ	R507	117-3301-10	1/10W 33Ω
Q306	125-0002-03	RN2403	R304	117-3321-10	1/10W 3.3kΩ	R508	117-2211-10	1/10W 220Ω
Q400	100-1162-00	2SA1162	R305	117-1021-10	1/10W 1kΩ	R509	117-1511-10	1/10W 150Ω
Q401	102-2712-00	2SC2712	R306	117-1021-10	1/10W 1kΩ	R510	117-1831-10	1/10W 18kΩ
Q402	103-1683-00	2SD1683	R307	117-3331-10	1/10W 33kΩ	R511	117-1031-10	1/10W 10kΩ
Q403	125-2004-07	RN1407	R308	117-3331-10	1/10W 33kΩ	R512	117-1021-10	1/10W 1kΩ
Q404	100-1431-00	2SA1431	R309	117-2231-10	1/10W 22kΩ	R513	117-1021-10	1/10W 1kΩ
Q405	125-2004-03	RN1403	R310	117-1031-10	1/10W 10kΩ	R514	117-4711-10	1/10W 470Ω
Q406	100-1428-00	2SA1428	R311	117-1031-10	1/10W 10kΩ	R515	117-5611-10	1/10W 560Ω
Q407	101-1143-00	2SB1143	R312	117-2231-10	1/10W 22kΩ	R516	117-1241-10	1/10W 120kΩ
Q408	190-1362-00	2SA1362	R313	117-6831-10	1/10W 68kΩ	R517	117-5601-10	1/10W 56Ω
Q409	125-2004-07	RN1407	R314	117-1031-10	1/10W 10kΩ	R518	117-1811-10	1/10W 180Ω
Q450	125-0021-07	DTA113ZU	R315	117-6831-10	1/10W 68kΩ	R519	117-1811-10	1/10W 180Ω
Q501	102-3125-00	2SC3125	R316	117-1031-10	1/10W 10kΩ	R520	117-1021-10	1/10W 1kΩ
Q502	102-2712-00	2SC2712	R317	117-1031-10	1/10W 10kΩ	R521	117-2221-10	1/10W 2.2kΩ
Q503	102-2712-00	2SC2712	R318	117-1031-10	1/10W 10kΩ	R522	117-2211-10	1/10W 220Ω
Q504	102-2712-00	2SC2712	R319	117-1021-10	1/10W 1kΩ	R523	117-2211-10	1/10W 220Ω
Q505	102-2712-00	2SC2712	R320	117-4731-10	1/10W 47kΩ	R524	117-2211-10	1/10W 220Ω
Q506	102-2712-00	2SC2712	R321	117-4731-10	1/10W 47kΩ	R525	117-1031-10	1/10W 10kΩ
Q507	103-1306-00	2SD1306	R322	117-4731-10	1/10W 47kΩ	R526	117-5611-10	1/10W 560Ω
R61	117-2211-10	1/10W 220Ω	R323	117-1011-10	1/10W 100Ω	R527	117-3311-10	1/10W 330Ω
R72	117-1021-10	1/10W 1kΩ	R324	117-1011-10	1/10W 100Ω	R528	117-5601-10	1/10W 56Ω
R100	117-1011-10	1/10W 100Ω	R325	117-4731-10	1/10W 47kΩ	R529	117-2231-10	1/10W 22kΩ
R101	117-1011-10	1/10W 100Ω	R326	117-1011-10	1/10W 100Ω	R530	117-4721-10	1/10W 4.7kΩ
R102	117-1011-10	1/10W 100Ω	R327	117-1011-10	1/10W 100Ω	R531	117-4711-10	1/10W 470Ω
R103	117-1011-10	1/10W 100Ω	R328	117-1021-10	1/10W 1kΩ	R532	117-4711-10	1/10W 470Ω
R106	117-1531-10	1/10W 15kΩ	R329	117-0000-00	1/10W 0Ω JW	R533	117-4711-10	1/10W 470Ω
R109	117-4711-10	1/10W 470Ω	R400	117-1021-10	1/10W 1kΩ	R534	117-1021-10	1/10W 1kΩ
R111	117-1531-10	1/10W 15kΩ	R403	117-1031-10	1/10W 10kΩ	R535	117-1031-10	1/10W 10kΩ
R113	117-2231-10	1/10W 22kΩ	R406	117-1031-10	1/10W 10kΩ	R536	117-1031-10	1/10W 10kΩ
R114	117-5611-10	1/10W 560Ω	R407	117-1031-10	1/10W 10kΩ			

■ PRINTED WIRING BOARD

Main PWB (B1)



■ CIRCUIT DIAGRAM

Main PWB (B1)

